

Chapter 1

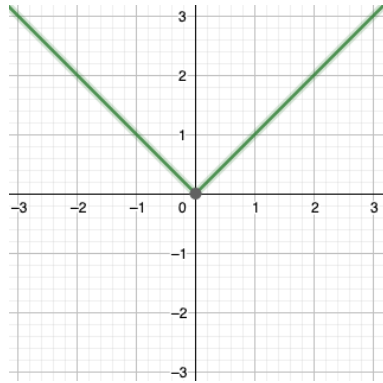
Linear Functions



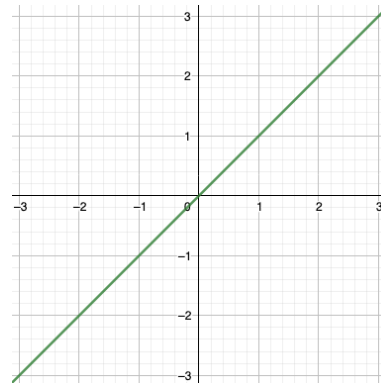
1. **Parent Functions and Transformations**
2. Transformations of Linear and Absolute Value Functions
3. Modeling with Linear Functions
4. Solving Linear Systems

1.1 - Parent Functions and Transformations

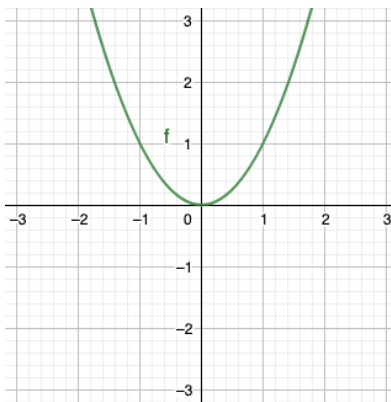
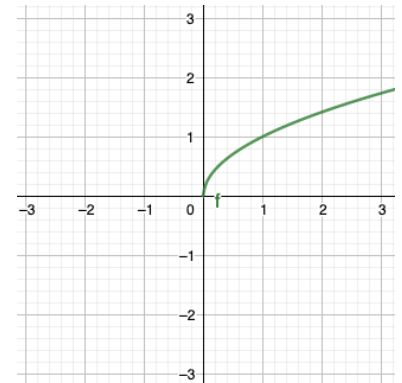
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$$y = |x|$$



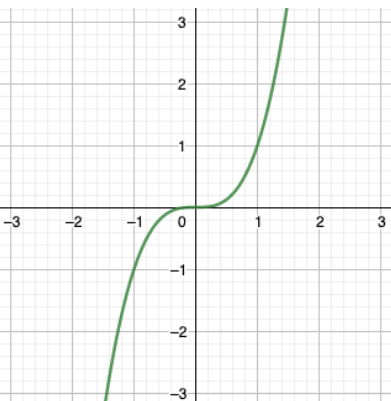
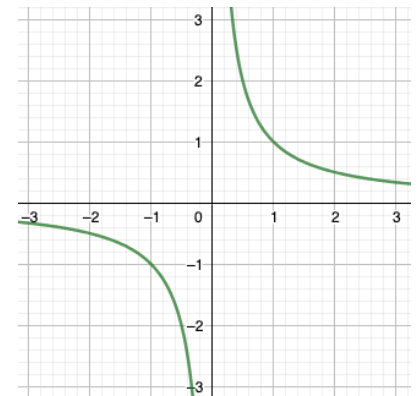
$$y = \sqrt{x}$$



$$y = x^2$$

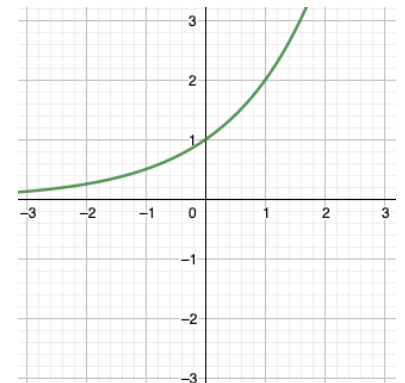
$$y = x$$

$$y = \frac{1}{x}$$



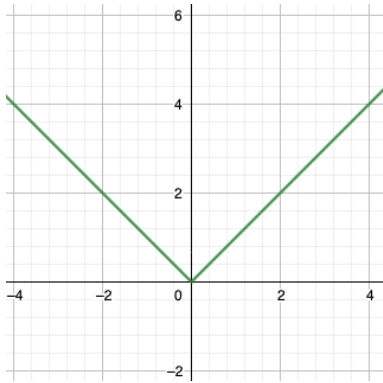
$$y = x^3$$

$$y = 2^x$$

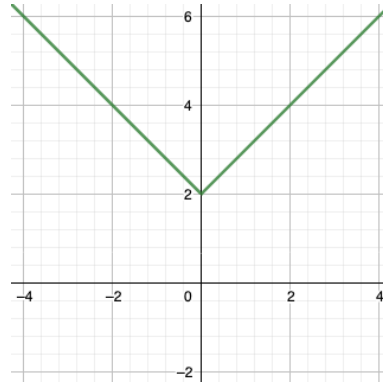


1.1 - Parent Functions and Transformations

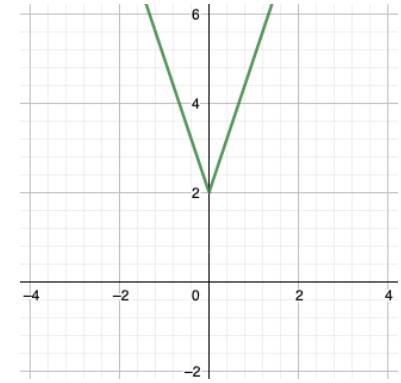
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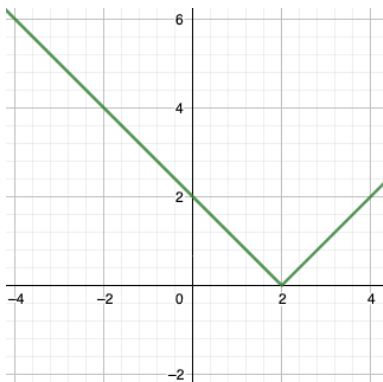
$$y = |x|$$



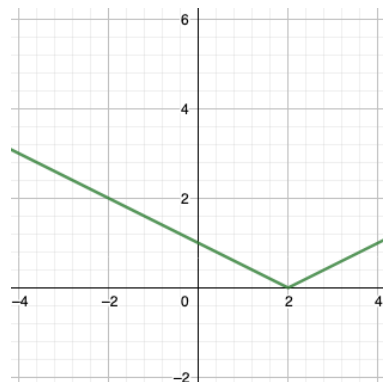
$$y = |x| + 2$$



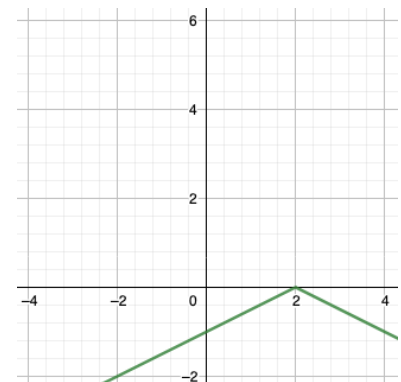
$$y = 3|x| + 2$$



$$y = |x - 2|$$



$$y = 0.5|x - 2|$$



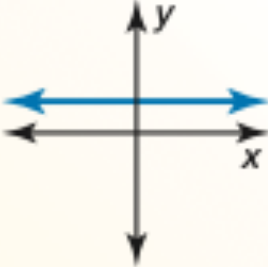
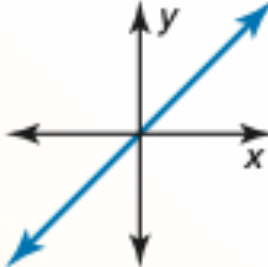
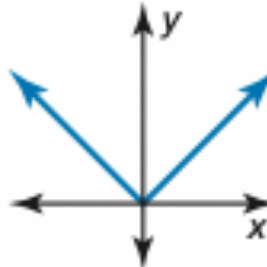
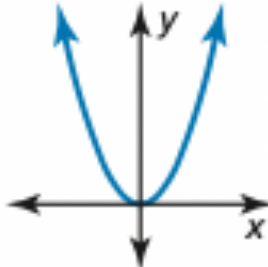
$$y = -0.5|x - 2|$$

1.1 - Parent Functions and Transformations

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Parent Function - The most basic function in a family of functions. Functions in a family are *transformations* of the parent function.

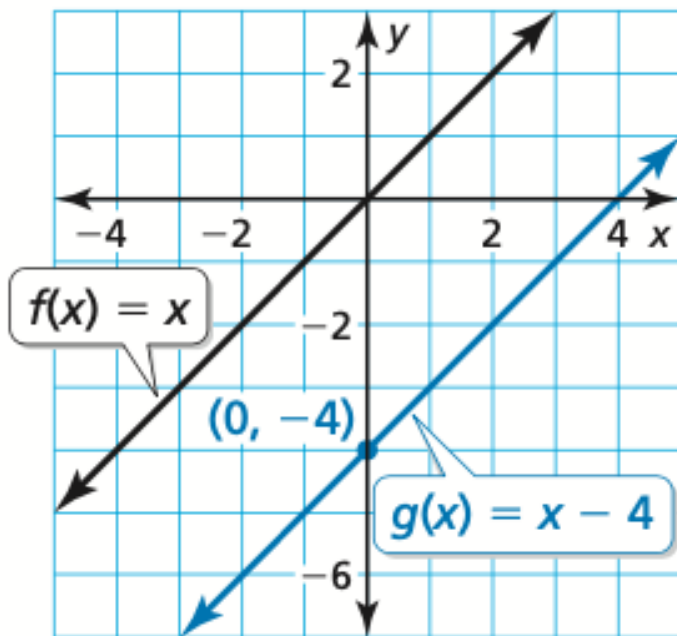
Parent Functions

Family	Constant	Linear	Absolute Value	Quadratic
Rule	$f(x) = 1$	$f(x) = x$	$f(x) = x $	$f(x) = x^2$
Graph				
Domain	All real numbers	All real numbers	All real numbers	All real numbers
Range	$y = 1$	All real numbers	$y \geq 0$	$y \geq 0$

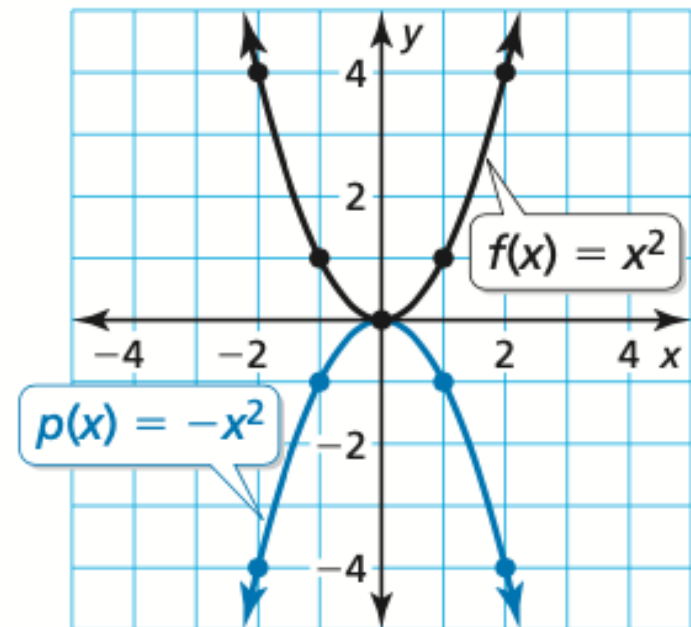
1.1 - Parent Functions and Transformations

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Transformations - The change in size, shape, position or orientation of a graph.



Translation

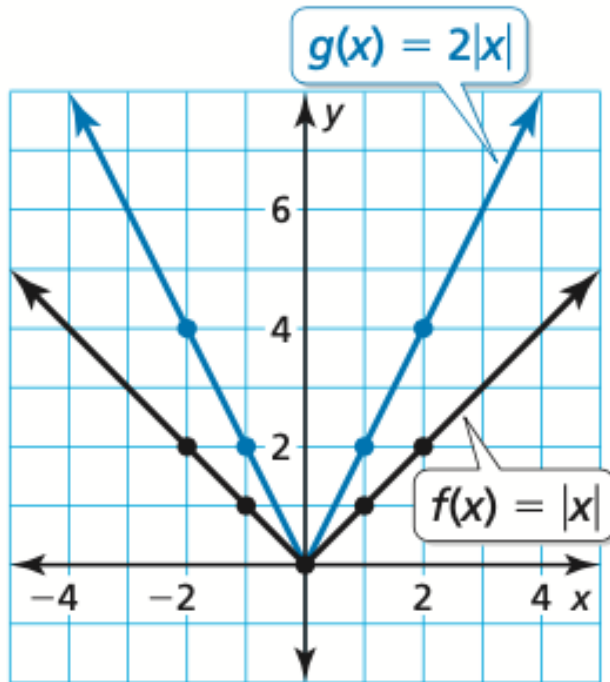


Reflection

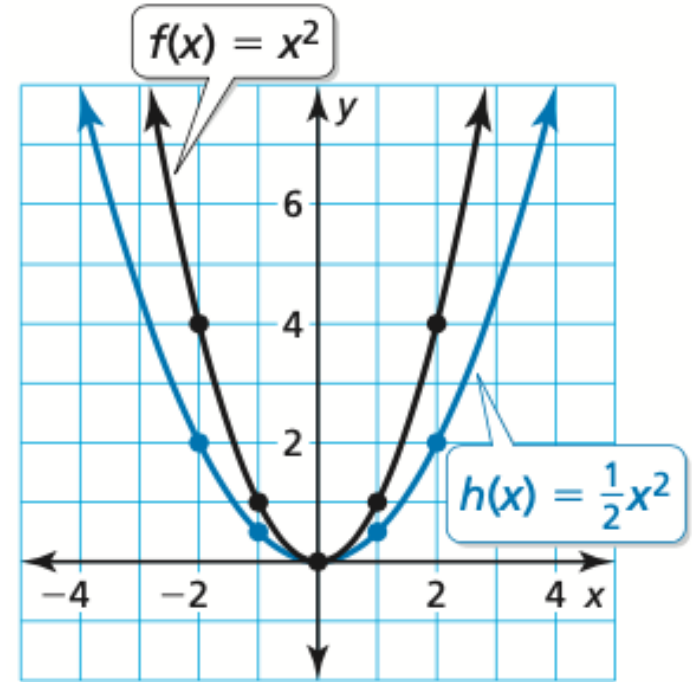
1.1 - Parent Functions and Transformations

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Dilation - Multiply y-coordinate by same positive factor (not 1).



**Vertical
Stretch**



**Vertical
Shrink**

1.1 - Parent Functions and Transformations

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Describe the transformations

$$d(x) = 3(x - 5)^2 - 1$$

